Report of the Offshore Wind Ad Hoc Working Group

Marine Fisheries Advisory Committee

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Introduction

Following an informational presentation on Wind Development in the Marine Environment at the 2019 spring meeting in Portland, Maine, the Marine Fisheries Advisory Committee (MAFAC) organized an Ad Hoc Working Group to assess the possible social, ecological, scientific, and resource management impacts of offshore wind farm development on marine fisheries and protected resources of the United States. Many members had heard concerns from fellow stakeholders that offshore wind development was progressing at a rapid pace, there did not appear to be adequate engagement with the broader fishing community, and members were concerned about the potential impacts to NOAA Fisheries research and scientific surveys and monitoring. At its next meeting in November 2019, MAFAC met with the Chief of the Office of Renewable Energy Programs from the Bureau of Ocean Energy Management (BOEM, a bureau of the Department of the Interior) to better understand the scope of proposed offshore wind development. Following that discussion, MAFAC drafted a list of initial concerns that it approved and forwarded to NOAA leadership and the Secretary of Commerce. The concerns sent forward in MAFAC's November 15, 2019, letter included:

- Understanding how NOAA Fisheries annual surveys and other science enterprise activities may be impacted, and what can be done at both the leasing and permitting process to mitigate impacts.
- Lack of understanding about the potential cumulative impacts to marine ecosystems, protected species and fisheries, given lease sale EISs are developed for particular wind energy areas, which are more localized rather than a coast-wide assessment.
- Lack of a national, strategic approach that implements a process to engage multiple stakeholders, in addition to mandatory public comment periods.
- Unfunded mandates. The MAFAC feels it is critical to secure a funding source and process for the expanded demand for regulatory, socio-economic and scientific services by securing annual funding sources to support NOAA Fisheries Science Center, Regional Office and Headquarters activities including research associated with developing a baseline (typically understood to be developed before permitting and construction begins) and monitoring construction and operations impacts.

MAFAC pledged to continue investigating these concerns and to develop detailed recommendations to submit to NOAA and the Secretary. This report outlines our concerns in more detail and identifies key recommendations to address impacts to NOAA Fisheries surveys and research, cumulative impacts to the ecosystem, outreach and collaboration with other resource management partners, communications with all stakeholders, and unfunded mandates.

Background and Context

Changes in marine policy and improvements in technology have led to a rapid increase in the number of offshore wind-energy proposals and projects being considered over the last five years, concurrent with U.S. energy needs. Offshore wind development is considered to be an important, future source of energy for the 40% of the U.S. population that lives in coastal communities. Growth in the marine segment of this industry, however, is progressing quickly with little or no information available to assist decision makers regarding the economic, social, and environmental impacts that are likely to occur in marine systems.

One example of the magnitude and scale of future projects is that approximately 10% of the offshore shelf region along the Atlantic coast from North Carolina to Massachusetts is currently being considered for development, planning, and future leasing. Floating wind technologies are now being planned for the Gulf of Maine and the Pacific coast as well. Lack of consistent and comprehensive oversight on such development will impact sediment load and current patterns, ecosystem function, ecosystem services, prosecution of fisheries, the wellbeing of fishing communities, marine mammal migration, sustainability of endangered species, protection of essential fish habitat, aquaculture development, recreation fishing practices, vessel safety, and how all these elements interact. Additionally, if not managed or considered comprehensively, development can impact annual NOAA Fisheries scientific surveys and other data collections, which in turn can impact management of important fisheries, protected species, and other mission-critical scientific and environmental work of NOAA and other data users. Furthermore, the task to assess and mitigate the potential impacts this will have on NOAA Fisheries' scientific enterprise is vast. However, no additional funding has been provided to date to determine the level or extent of the impact, thus creating an unfunded mandate. The situation is complex and requires significant coordination to account for the multiple federal and state regulatory jurisdictions across multiple coastlines.

MAFAC is concerned that offshore wind development is racing forward without these critical issues being fully addressed. Currently, there are 16 active offshore wind leases along the East Coast of the U.S. with more Wind Energy Areas under consideration, and wind development along the Pacific coast is not far behind. While wind speeds in the Gulf of Mexico are generally lower than on other coasts, the large areas with shallow depths available and proximity to complementary infrastructure allow consideration there as well, especially in the northern and western Gulf.

Meaningful outreach to stakeholders, directly or indirectly affected by wind farms on the outer continental shelf (OCS), is a critical requirement for planning these large-scale installations. Web-based presentations, conference calls and participation by BOEM in regional forums has not been sufficient to engage the varied stakeholder groups affected by offshore wind energy (OWE) projects. This has resulted in distrust and anger based on a perceived lack of transparency and input into the planning process.

Key stakeholders include commercial and recreational fishers, fisheries scientists and managers, environmental groups, and ocean researchers. Offshore wind emplacements impact local ecosystems and have the potential to interfere with fishing activities and data gathering needed to support fisheries with sound science. Limiting and mitigating those impacts is incumbent on developers and BOEM and can be accomplished through a robust public and interagency review and comment process. Due to the potential size and impact of these facilities, it is imperative that the public and stakeholders know in advance all changes to coastal waters, ecosystems, access, and viewscapes.

BOEM has engaged with and facilitated regional bodies concerned about OCS renewable energy including the Responsible Offshore Development Alliance (RODA) on the east coast of the U.S. and Intergovernmental Renewable Energy Task Forces in states including California and Oregon. These organizations have members from fishing communities, local and regional governments, and federal agencies including NOAA Fisheries. RODA was formed by the east coast fishing industry to better engage with BOEM in response to offshore development. The state and regional intergovernmental Task Forces are facilitated by BOEM for information exchange and input from regional areas where offshore energy is being considered. The

formation of RODA was an example of stakeholders reacting to a process that they were not effectively engaged in. The current Task Forces are a step in the right direction but BOEM must better inform and engage stakeholder groups at all levels of the OWE process.

Issue 1: Impacts to NOAA Fisheries Annual Surveys and Other Science Enterprise Activities

Well designed, standardized resource surveys are integral to data gathering processes that NOAA Fisheries uses to monitor environmental conditions and determine stock status for the Nation's fisheries along with the conservation and recovery of protected species. Any fisherman you talk with, as well as scientists leading NOAA Fisheries surveys, will tell you there are certain places in the ocean where gear shouldn't be set. Be it rocky outcroppings or a sunken vessel, such locations are prone to result in lost or damaged gear. With the potential deployment of sophisticated wind farm technology on the offshore shelf, there will be a significant increase in wind energy gear deployed over the offshore shelf, such as submarine cables, anchors, turbine footings, and extensive above-water turbine structures and towers. In addition to potentially disrupting fishing practices and ecosystem services, we wish to highlight certain scientific data gathering exercises that may be compromised by the presence of this gear.

Standardized biological and other resource surveys are typically designed with the random placement of gear in statistical strata to achieve unbiased estimates of fish abundance, distribution, vital rates, and other data. Depending on the density and configuration of the deployed wind farm gear, certain areas, even broad areas, may no longer be accessible for surveying. Recent reviews of the Marine Recreational Fishery Statistics Survey (MRFSS) program, noted that missing critical elements of the fishery can lead to poor estimates of landings or, in the case of biological surveys, abundance and demographic parameters (age, weight, length, maturity, fecundity, mortality). Steps should be taken to plan for and avoid where possible the loss in the standardized survey practices. The spatial extent, placement, and density of the farms will determine whether or not they can be safely fished or surveyed. Under certain conditions, how the wind farms are placed may act like a marine protected area, but even marine protected areas can be surveyed by NOAA Fisheries.

Given the growing interest in offshore wind energy production, the United States should become more invested in considering area-based conservation measures. For addressing area-based survey statistics, NOAA Fisheries should consider how the present wind farm lease locations overlap with key fishing locations and essential fish habitat. Will the wind farm structures be creating new habitat, change biological rates or behavioral ecology of species, or will it attract species from surrounding habitats and making them more vulnerable to capture? Will new survey gear be needed, or will new survey strata need to be created? Other U.S. agencies, such as BOEM, need to better coordinate with NOAA, NOAA Fisheries, and other stakeholder organizations on these questions to avoid impacts.

If steps are not taken now, increased uncertainty in stock assessments will lead to a decrease or reallocation of quotas. This will increase mistrust in government agencies and management. When possible, gaps in the data collection might be mitigated using modern estimation techniques, but this can often be tricky. Scientists and managers could review the growing body of literature on the interactions of wind development on the environment in the North Sea, but even this is limited. These North Sea offshore wind energy generators have been in place for several decades, some are now being decommissioned, and there may be lessons to be learned. However, there is little to no peer reviewed literature on impacts to fisheries surveys.

Issue 2: Potential Cumulative Impacts to Marine Ecosystems

"*Considering cumulative effects is...essential to developing appropriate mitigation and monitoring its effectiveness*" (p. v, CEQ 1997).

The MAFAC wants to ensure that agencies (BOEM, NOAA, etc.) assess potential impacts at multiple spatial and temporal scales when scoping the cumulative and indirect effects for NEPA. Cumulative direct and indirect impacts to marine ecosystems in the near-term and long-term are likely to differ regionally, and agencies must be prepared to mitigate effects at both scales. Impacts assessments also should assess potential damage resulting from both construction and maintenance activities. For example, what are the potential impacts of vibrations, sounds, and electromagnetic fields during operation? Moreover, it is paramount that agencies assess and mitigate short- and long-term indirect effects such as the relocation of shipping channels and fishing grounds, especially when compounded with potential impacts from climate change. Like a pebble in a pond, these impacts are likely to ripple throughout the ecosystem and affect the lives and livelihoods of all ocean users.

An individual state's renewable energy mandates may result in OWE projects being evaluated piecemeal - one project at a time. Multiple jurisdictions can occur close together, especially in the Northeastern US. MAFAC is concerned that impacts of OWE to address one state's needs may be assessed at the expense of examining regional impacts at larger scales. Is there a density limit? Is there a carrying capacity above which one additional wind farm could cause irreparable harm to the ecosystem? If so, what is that carrying capacity and at what scale - what are the incremental costs to marine ecosystems of adding one farm to a landscape full of wind farms? What about an undeveloped landscape with no wind farms? How are impacts of cables, which also traverse state waters, being assessed cumulatively? Furthermore, several highly migratory and protected species live along our coasts that are likely to be impacted by wind farms, even if farms are concentrated in a small area. We encourage permitting authorities to analyze impacts on narrow and broad spatial scales including the entire Atlantic and Pacific coasts, irrespective of state boundaries.

The MAFAC also is concerned about proposed rule changes to NEPA and how they may impact the assessment of indirect and cumulative effects of offshore wind farms. Specifically, eliminating the requirement to assess cumulative and indirect effects of federal actions could irrevocably damage marine ecosystems including essential fish habitats, fisheries and fisheries management, and highly migratory and protected species. Allowing the wind farm and alternative energy industry to conduct its own Environmental Assessments and Environmental Impact Statements (EIS) is akin to allowing the fox to guard the henhouse. Why would the industry be prudent in creating such documents? What expertise would they bring to bear on such assessments?

Should the proposed NEPA rule change be implemented, the **MAFAC strongly recommends that the appropriate agencies stay heavily involved in preparation of these documents and only approve those that meet strict standards currently in effect.**

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Issue 3: Lack of a national, strategic approach that implements a process to engage multiple stakeholders

Involving stakeholders in environmental decision making creates more realistic policies by incorporating citizen's values, increases trust and buy-in of the users by improving agency transparency, and can improve the quality and legitimacy of the decisions by considering and incorporating multiple perspectives. The MAFAC feels that siting and construction of offshore wind farms (and offshore energy in general) should prioritize involving affected stakeholders early in the process. Many of MAFAC's concerns stem from the fact that offshore wind farm siting does not engage stakeholders in a "bottom-up" manner, but rather caters to industry and government "insiders." Improved and proactive communication and outreach by BOEM to affected stakeholders, including the nation's fishing industry and its participants, is critical to addressing this issue. Engaging and holding listening sessions with multiple stakeholders is a necessary step for BOEM when considering facilities in coastal fishing areas. NOAA Fisheries and BOEM must continue to support and work with existing representative bodies including Regional Ocean Partnerships, Fishery Management Councils, and other representative groups to share information early in the planning process, gain necessary input and coordinate actions. However, the MAFAC believes that outreach must go beyond these bodies and address stakeholders directly, engaging them early in the planning process. Planning for large OWE facilities requires fully collaborative and transparent ocean planning that seeks to build stakeholder trust and support.

The lack of a national strategy for OWE planning has led to a piecemeal approach that has resulted in anger and dissatisfaction by fishermen and others with regional processes. The national priority to achieve energy independence and transition to renewable sources resulted in OWE projects on the Atlantic seaboard being permitted and constructed with minimal input from stakeholders and review by federal and state agencies. As interest in building OWE projects in other areas of the U.S. increases and BOEM considers additional lease sales, a transparent, comprehensive, accessible, standardized "bottom-up" approach to stakeholder outreach will benefit them, the OWE industry, and stakeholders. The current process across different regions of the U.S. is disparate and difficult to follow. BOEM needs to improve and standardize engagement with coastal communities, recreational and commercial fishers, environmentalists, researchers, and other ocean users/industries whose livelihoods and heritage depend on responsible use of the coastal areas of the U.S.

Information sources for proposals, actions, research, public comments, etc. are difficult to find for many stakeholders. Varied sources of information often make it difficult to track down. BOEM has compiled resources at the https://www.boem.gov/renewable-energy website but there are numerous other sources of data and information. The MAFAC believes that BOEM could better inform the public by including links to other sources of information in their website. Currently it takes time and expertise to find some sources including fact sheets at the American Wind Energy Association (AWEA) site, research compiled on the Tethys website hosted by Pacific Northwest National Laboratory (PNNL) and a host of others. BOEM should ensure that stakeholders have all the necessary information easily accessible for input and engagement in OWE processes.

Improvements to stakeholder outreach would be achieved by initiating public discussion earlier in planning processes. BOEM would benefit by and achieve better outreach by widely publicizing proposals including maps and illustrations of proposed facilities with viewscapes from shore and other perspectives. BOEM may be meeting its legal responsibilities, but it must

do more to meaningfully engage stakeholders early and often in the planning process to minimize post-development resentment.

In particular, members of the fishing industry feel there has been a communication breakdown with BOEM regarding OWE. This breakdown has engendered distrust, anger, and fear based on beliefs that the areas where they fish can be taken away with little or no say so. There is a perception that the "real estate" essential for their business is being reduced on a large scale. The fishing industry has a special interest and long-standing economic dependence on U.S. ocean resources. The old saying, "You are either at the table or on the menu," rings true to fishing communities. Communication from BOEM on OWE to-date has been insufficient and is perceived as perfunctory. Fishing interests and other stakeholders have not been given seats at the decision-making level and feel their voices are not being heard. BOEM needs to expend the time and resources required to properly engage with the fishing industry and other ocean users and incorporate their input into the decision-making process.

Commercial fishers have a special interest in and dependence on the use of the ocean, but many other groups share that interest and dependence. Recreational fishers, tourism, the shipping industry, and non-consumptive users are concerned about loss of access. Conservation groups are concerned about impacts to local ecosystems and migrating animals, and tribal communities share all of those concerns including changes to viewscapes that have been part of their culture for thousands of years. BOEM must standardize their approach across the U.S. to engage all stakeholders when developing OWE in U.S. coastal areas.

Issue 4: Funding needs

A: Unfunded Mandates

There are significant resource demands required of NOAA Fisheries from Offshore Wind Energy development before, during, and after construction with no attached funding mechanisms

Offshore wind energy (OWE) development impacts a broad spectrum of people, organizations, industries, and environments. Consequently, OWE development impacts virtually all the activities, missions, and responsibilities that fall under the jurisdiction of NOAA Fisheries. From habitat impacts, to the implementation of fisheries surveys, factors influencing the performance of basic and applied fisheries science, to the economic and cultural well-being of fishing stakeholders, and meeting all statutory and regulatory responsibilities, the entire spectrum of NOAA Fisheries operations is affected. Considerable attention, therefore, must be paid to how each and every potential and actual OWE site around the country is being implemented. Close and continuous involvement of NOAA Fisheries personnel with OWE activities is required to comply with the agency's mission. The agency routinely incorporates relatively modest ad hoc activities on a daily basis. We are concerned with the quantum, multi order-of-magnitude increase of demand on the agency's resource base. For example, the burgeoning EIS review requirement resulting from dramatically increasing site developments. The timing and intensity of these rapidly growing OWE activities may require a significant shift in NOAA Fisheries' priorities resulting in an unavoidable interruption in mission achievement for the agency. The concern is not for the priority shifts that can be accommodated, but for those that result in the inevitable losses or delays in current NOAA Fisheries mission priorities.

The losses to marine stakeholders such as recreational and commercial fishers are potentially severe and yet left unaccounted for. We're speaking here of costs and risks to the various communities in economic, social, environmental, and scientific terms resulting from OWE

development that goes unmonitored and whose impacts are left unaddressed. We are also mindful of the unknown or unintended costs that are not foreseen, but inevitable. However, this discussion is related to the existing, foreseeable costs adversely impacting how the NOAA Fisheries carries out its mission and that need immediate attention and resolution. We are not addressing the impacts to other agencies, states, or non-Fisheries Service-related activities.

Perhaps the most significant impact is to the ongoing scientific programs currently being carried out by the NOAA Fisheries; science is intimately involved from the very first step of an OWE project and then for decades beyond the life of that development. Since OWE is relatively new, there is much not known about basic questions concerning its impact on the marine environment, so basic research is needed for the most pressing of those questions. To their credit, BOEM has funded some of those studies and hopefully will continue to do so. Current projects being funded by BOEM and the Department of Energy, however, do not fully address the concerns raised here. The new research and the implementation of management actions that is necessary to anticipate and address regional impacts is a major concern. At a minimum, funding must be available to support the highest priority questions of both basic and applied research for any OWE project under consideration for implementation. We recognize that not all science issues can or will be addressed, but certainly those that potentially have a major impact on the environment, the ability of the agency to carry out congressional directives, or otherwise address social and economic impacts to stakeholders will need additional financial support to ensure the bare minimum of a scientific understanding to support ongoing managerial actions.

Another issue of concern is the negative impact of OWE projects may have to existing science supporting fisheries management and protected species conservation and recovery programs, as noted under Issue 1, above. For example, long standing trawl surveys provide fundamental information to support annual stock assessments. Given the spatial extent and density of the proposed wind farms along with proposed maximal turbine blade heights, ongoing research and survey monitoring may have to be altered or canceled due to the location, elevations, and spatial distribution of a particular OWE development. Furthermore, traditional fishing grounds may be overtaken, forcing the fleet to move elsewhere with the subsequent disruption in both livelihoods as well as data collection. The costs and consequences of a disruption or discontinuance of existing activities may not be known for many years. Mitigation for these impacts needs to be part of each OWE development's cost consideration.

Finally, there is also the issue of the obligations of NOAA Fisheries to provide scientific support and regulatory consultation for each OWE project. The agency's science arm is currently stretched thin with limited resources to support their mission. Unplanned workload means additional demands on staff and resources within the agency. Beyond the research and consultation demands are the administrative needs to support them. And while this area is normally not an area for great concern, OWE projects have demonstrated a new level of attention and need for resources that currently do not exist. For example, the NOAA Fisheries has long and extensive experience and expertise in dealing with NEPA and EISs. It is clear that BOEM will require considerable support in the near- and possibly medium-term to ensure that marine environments are not significantly compromised. It is also clear that an eagle eye will be required for all future OWE developments to ensure that the NOAA Fisheries mission is not compromised. The recent experience with the Vineyard Wind DEIS is a good example of that problem. While it is reasonable to expect BOEM to eventually ascend the learning curve and achieve sufficiency in developing EISs, it is also likely that considerable input from each affected Fisheries Science Center and Regional Office will be necessary until that level is achieved. Given the limited number of staff available to each Center and Regional Office, an increase in

staffing with the necessary funding should be expected. The potential magnitude of additional staff required may be quite large.

These problems, often referred to as unfunded mandates, resulting from rapid OWE development, will exacerbate current demands on the agency. The expanding magnitude of the impact is almost certain to put NOAA Fisheries in an untenable position. Either it seriously compromises the vital functions of the agency that are required to fulfill its mission or the attention that will be given to OWE considerations will be less than adequate. We believe that neither outcome is acceptable. Consequently, efforts must be made to acquire the resources needed to both achieve congressional mandates and to adequately support ongoing and future OWE projects

Additional funding is critical to ensuring NOAA Fisheries both accomplishes its mission and accommodates the workload engendered by OWE. The message is clear: additional funding is a *sine qua non* as a result of OWE. We note that there are other activities that remain unfunded outside of those pertaining to NOAA Fisheries directly that are not addressed here, namely those that will be faced by state agencies, councils, commissions and other management institutions as well as by the stakeholders and public.

B. Other Funding Needs (non-NOAA)

Absent adequate mitigation such as redesigning and relocating OWE projects, and to alleviate catastrophic loss of income, a last resort remedy would be for OWE developers to reimburse fishermen to compensate them for displacement from fishing grounds before, during, and after construction. The MAFAC urges NOAA Fisheries to work with BOEM to create a plan for collecting and distributing money for this purpose.

We recognize that Congressional action is intimately tied into the several possible funding sources listed in Section C, below. It is incumbent upon NOAA Fisheries to describe the problems in detail to Congress and its stakeholders so that they a) fully understand and appreciate the issues; and b) are sufficiently well-informed to take such action as they deem appropriate.

The MAFAC recommends that NOAA Fisheries develop a specific and comprehensive rationale for funding needs. Generalities are insufficient to make the argument and win support. Details on costs, mechanisms for implementation, and timelines are critical to avoiding the higher risks and costs anticipated down the line. These details should be outlined now so that funding can be prioritized, and sources of funding can be identified.

C. Potential Funding Sources

To comprehensively assess the benefits and consequences of OWE development, funding likely will come from a combination of different sources. Adequate funding is necessary to mitigate environmental degradation, socio-economic impacts to stakeholders, and disruptions in how NOAA Fisheries carries out its mission, as outlined in Section A, above.

Here we list some possible sources of funding:

1. **Increased Congressional budget allocation** - If achieved - would serve a threefold purpose. First, it would provide much of the funding necessary to conduct a comprehensive risk assessment. Second, it would identify the problem and its magnitude to the public to generate further support. Thirdly, by identifying the risks and benefits of OWE, it would inform other related Congressional missions.

2. **Flag additional support funds through BOEM, DOE, and other Federal agencies**- Importantly, the right type of funding would be optimally identified informally agency to agency by jointly framing the problem and seeking equitable solutions.

3. **Targeted lease sale funds allocation** - Instead of all funds going to the general treasury, allocate portions of the proceeds to NOAA Fisheries to cover additional expenses resulting from the development over its implementation and lifetime.

4. **Identify a mechanism for taxation on OWE development** - As a fee for the opportunity, the company funds the additional costs to the agency over the lifetime of the project. It could be an upfront or amortized payment.

5. **Create a reimbursement fund by OWE developers** to compensate fishermen for loss of income and displacement of fisheries.

Recommendations

Recommendations to address impacts to NOAA Fisheries surveys and research

1. Given additional funding, consider the impact of alternative survey designs as well as survey mechanisms (e.g. newly developed vessels, alternative gear conformations, further development of remote sensing approaches such as acoustic and video monitoring operated off ROVs or fixed monitoring stations).
2. Look to existing OWE implementations (i.e. OWE in the North Sea) as well as the experience gained from challenges experienced in the regular operation of U.S. surveys (e.g. government shutdowns, weather, oil platforms, shipwrecks) that have interrupted either temporarily or permanently ongoing assessment and monitoring programs.
3. Make sure to include peer review to ensure that whatever changes are mandated are carried out so that the best possible science is being used.

Recommendations to address cumulative impacts

1. We encourage permitting authorities to analyze impacts on narrow and broad spatial scales including the entire Atlantic and Pacific coasts, irrespective of state boundaries.
2. MAFAC strongly recommends that the appropriate agencies stay heavily involved in preparation of these documents and only approve those that meet strict standards currently in effect.

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Recommendations to improve outreach and collaboration

1. As one step in ensuring open communication, the MAFAC recommends that NOAA and BOEM continue to support and work with Regional Ocean Partnerships, and Councils and Commissions to coordinate actions.
2. To address concerns about piecemeal activities authorized by the states, the MAFAC recommends better coordination of OWE development projects across multiple agencies and multiple jurisdictions.

Recommendations for better communications with stakeholders

1. BOEM and other federal agencies and states need to engage stakeholders in a bottom-up, multi-user manner. MAFAC recommends BOEM use the many avenues of communication that already exist within NOAA to reach more fishermen, not just organizations (for example, all permit holders in an area through the National Angler Registry). Similarly, they should share and request that all Fishery Management Councils, Commissions, and other organizational bodies (e.g. Gulf of Mexico Alliance) broadcast their notices.
2. BOEM should publicize proposals early in the permitting process in widely read regional and local media outlets, using user-friendly language (reduce jargon), and should include conceptual drawings, maps, or other user-friendly visuals. All visuals should clearly depict what proposed, what activities it encompasses, and what spatial areas may be proposed closed to fishing, research, or other activities. This should include not just the placement of wind turbines, but also transmission cables, anchor cables, or other structures.
3. Commercial fishermen, processors, and other stakeholder interests should have permanent seats on all wind energy committees and subcommittees. Ensure all coastal communities' interest groups are included.
4. Wind energy companies and/or BOEM should hire consultants, recommended by fishing and processing organizations, and that can engage with the fishing community writ large to integrate those stakeholders' and residents' participation into this process in a significant and material manner.
5. BOEM and the wind energy companies involved in this process need to invest time with commercial fisherman, processors, charter operators, all fishing associations, ports, and other representative groups from fishing communities to better understand what is necessary to preserve these industries. This need is greater than an occasional meeting or webinar, or stopping for an hour for a brief chat. The hired consultants noted in (4) would be instrumental in this process. Town hall meetings are also important.
6. Recommend a one-stop shop information portal - communication is diffuse and difficult to stay current. This should include all proposed projects, perhaps organized regionally and by state rather than by project name.

Recommendations to address unfunded mandates

1. It is recommended that the Fisheries Service identify the basic science gaps applicable to OWE development that have the real potential for significant degradation to the marine ecosystems for each project. This prioritized list is the sine qua non for fundamental research studies to be funded as the result of OWE activities.

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2. NOAA Fisheries should identify risks (costs, losses of information) associated with factors inhibiting the normal prosecution of science and data collection associated with NOAA Fisheries science obligations. For example, does the footprint of a proposed wind farm disrupt long term bottom trawl survey objectives? If so, is there a way for that information to be collected in some other fashion or the cost of collecting using alternative methods mitigated?
3. Given that NOAA Fisheries is now being tasked with assessing the impact of wind farm installations in addition to its other duties, one must recognize that as important as that effort on impact assessment is, unless additional funding and personnel for conducting these tasks is provided, this work will detract from equally important tasks given the zero sum game that budgeting and time management are. Example: Would be a reduction in survey and time spent on data collection, stock assessment and management, endangered species research and enforcement, etc. To address the administrative costs that are beyond the agency's ability to absorb without appreciable disruption to the agency's mission, the NOAA Fisheries should identify such losses and costs. Once these losses and costs are identified, they will serve as part of the justification for additional funding.

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